



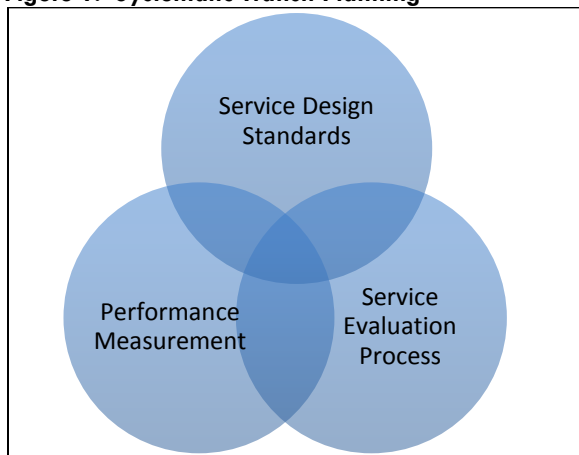
INITIATIVE 1: DEVELOP AND USE SERVICE GUIDELINES: PRACTICES IN OTHER AREAS AND POTENTIAL MA IMPROVEMENTS

Service standards are the foundation of transit service planning and provide an objective and consistent basis upon which to track service performance and make service decisions. Standards are typically used to define:

- How service should be designed
- How much service should be provided and when
- Acceptable productivity levels
- Acceptable cost efficiency levels
- A wide variety of other factors such as Title VI , access to work, and social equity.

Service standards are also used to measure and evaluate operational performance and to support service evaluation processes designed to improve overall system effectiveness (see Figure 1). In addition, service measures are used in the federal funding distribution formula, and also in some state funding distributions.

Figure 1: Systematic Transit Planning¹



Certain regional transit authorities (RTAs) in Massachusetts (MA) have established formal service standards, while others employ a variety of tactics to evaluate service performance or design new routes. Yet, there are no service standards or other consistent performance measurement systems used on the statewide level, making it difficult to accurately assess the effectiveness of much of the Commonwealth's transit system.

Furthermore, in 2009, the MA Legislature approved an *Act Modernizing the Transportation Systems of the Commonwealth* (Chapter 25 of 2009), which includes a requirement that MassDOT establish program goals and a system to measure performance against those goals, and report publicly on progress. In accordance with this law, MassDOT has created an Office of Performance Measurement and Innovation to be responsible for performance measurement, including the following specific requirements:

¹ *Best Practices in Transit Service Planning*, Center for Urban Transportation Research, University of South Florida, 2009



- Performance measurements shall include usage information for all modes of transportation, including measures of throughput, utilization and ridership. This information shall be presented with measurements of congestion, on-time performance, if appropriate, and incidents that have caused delays or closures. Performance measurements shall include assessments of maintenance performance by asset class, mode and region, with an explanation of current year and future year planned maintenance expenditures and the expected result thereof.
- Each MassDOT division shall develop a strategic plan for program activities and performance goals.
- Annual program performance reports shall be required and shall include measures of: maintenance activity, usage (ridership), operational performance, and planning, design and project delivery.
- These performance criteria will be used to determine the quality of service of all entities that perform transportation services on behalf of the Department.

To help RTAs comply with this mandate, to develop ways to assess the effectiveness of the Commonwealth's transit services, and to improve service, this document presents an overview of best practices related to the service standards and performance measurement, and describes potential approaches for Massachusetts.

INDUSTRY STANDARDS/Common Practice

Individual service standards and performance measures vary significantly among transit agencies. Most standards fall into one of four categories:

1. Service Availability
2. Service Delivery
3. Service Effectiveness
4. Cost Efficiency.

Within each category, a large number of measures are used; the most common are summarized in Table 1.

Table 1: Common Service Standards and Performance Measures

Topic	Measure
Service Availability	Extent of Service Area Covered Minimum/Maximum Distance between routes Service Frequency Span of Service Stop Location & Accessibility
Service Delivery	Vehicle Load On-time performance Speed Service Quality/Passenger Satisfaction Customer Amenities Safety
Service Effectiveness	Ridership Productivity (Passengers per vehicle hour or mile) Passengers per capita
Cost Efficiency	Total Cost per Passenger Net Cost per Passenger Operating Cost per Vehicle Hour or Mile



As illustrated in the following sections, most agencies utilize just a subset of these measures, depending on agency goals and objectives, data availability and the desired service evaluation process. As in many areas, the use of a limited, focused set of measures is usually more effective than the use of a more extensive list of measures.

In addition, different sets of thresholds are typically applied to different types of services. At the transit system level, distinctions are usually made among services (for example, rapid transit, light rail, bus, etc.). At the state level, distinctions are usually made among transit system types (for example, large urban, small urban, rural, etc.). Where services or transit systems are classified differently, the same basic measures are typically used, but different thresholds are set. For example, where the major productivity measure is passengers per vehicle hour, the acceptable level of performance could be set at 20 passengers per hour for large urban systems and 10 passengers per hour for small urban systems. Examples of classification systems are shown in Table 2, and additional information is described in the following sections.

Table 2: Examples of Bus Service Classification Systems

Transit System Classifications	Service Classification
Kansas City Area Transportation Authority	Key corridor routes Urban local routes Suburban local routes Commuter routes (peak) Lifeline services
Massachusetts Bay Transportation Authority	Local routes Key routes (high demand) Commuter routes Express routes Community routes
Livermore Amador Valley Transit Authority	Fixed-Route Demand-Response
State Classifications	Service Classification
North Carolina	Geographic (range of elevation and highway density) Demographic (density and rural population ratio)
Vermont	Urban Small Town Rural Demand Response Tourism
Pennsylvania	Peers grouped based on four criteria: <ul style="list-style-type: none"> • Total revenue hours • Total revenue miles • Vehicles in maximum service • Service area population
California	Urban Rural

TRANSIT AGENCY EXAMPLES

Kansas City Area Transit Authority (KCATA), MO

KCATA adopted Service Guidelines in 2011 as part of its Comprehensive Service Analysis (CSA). KCATA service guidelines establish service design principles and set service delivery and performance guidelines. The guidelines are presented as “best practice” due to their simplicity and clarity.



The service design principles are:

- Service should be simple
- Routes should operate along a direct path
- Route deviations should be minimized
- Major transit routes should operate along arterials
- Routes should be symmetrical (same in both directions)
- Routes should serve well defined markets
- Services should be well-coordinated
- Service should be consistent (alignment and headway)
- Stops should be appropriately spaced
- Service design should maximize service (minimize out-of-service time)

KCATA's service delivery guidelines consist of three measures as shown in Table 3. Additionally, KCATA measures route productivity using one single measure, which is Passengers per Revenue Vehicle Hour. The minimum service delivery and productivity guidelines work together to ensure that the appropriate levels of service are provided.

Table 3: KCATA Service Delivery and Performance Guidelines

Service Guideline	Measures
Service Delivery Guideline	Minimum Span of Service Minimum Service Frequencies Maximum Passenger Loadings
Productivity	Passengers per Revenue Vehicle Hour

As was shown in Table 2, KCATA classifies its services using a hierarchy of five service types (key corridor routes, urban local routes, suburban local route, commuter routes, and lifeline routes). KCATA sets different service delivery and productivity measures for each type of service, and by time of day (see Figure 2).

Figure 2: KCATA Productivity Guidelines by Service Type and Time of Day
Passengers per Revenue Vehicle Hour

Table 7: Minimum Productivity Levels (Passengers per Revenue Vehicle Hour)						
	Key Corridor		Urban Local	Suburban Local	Commuter	Lifeline
	MAK	Other				
Weekdays						
Early Morning	35	10	10	5	--	5
Late Night	15	10	10	5	--	5
All Day	40	30	20	15	20	5
Saturdays						
Early Morning	15	10	10	5	--	--
Late Night	15	10	10	5	--	--
All Day	35	25	20	15	--	--
Sundays						
Early Morning	15	10	10	5	--	--
Late Night	15	10	10	5	--	--
All Day	30	20	15	10	--	--



Livermore Amador Valley Transit Authority (LAVTA) CA

LAVTA is a small transit system located in Alameda County, southeast of Oakland, CA, that was identified as a “best practice” agency in TCRP’s *Transit Performance Measurement* guidebook.² It is presented as an example to demonstrate the application and use of performance measurement even within relatively small systems (71 fixed route vehicles, and 18 demand response vehicles).

Before developing specific performance measures and thresholds, LAVTA first established a set of agency goals. The performance measures shown in Table 4 apply only to the fixed route system, with performance targets set at a systemwide level. LAVTA plans to transition to a route-based performance measurement system and also to raise its service thresholds over time. The demand response system is currently evaluated against only one measure: passengers per hour.

Table 4: LAVTA Fixed Route Performance Measures and Targets

Measure	Performance Target
Farebox Recovery	Goal of 14%
Productivity	13.0 passengers/hour
Service Efficiency	Increase in operating cost shall not exceed increase in local CPI
Service Effectiveness	95% on time performance
	0% missed departures
	0% missed trips
	7,000 miles between road calls
Safety	50,000-70,000 miles between accidents
	1 passenger injury/100,000 boardings
	100% preventative maintenance inspections completed within 10% scheduled mileage

LAVTA contracts its services to a private operator and incorporates various incentive and penalty clauses into its contract depending on whether the above targets are met.

MBTA

The MBTA established service standards in 1996 as part of a Service Quality Project designed to improve the way the MBTA monitors and assesses its services to make them more responsive to rider demand. These standards (see Table 5) are used in the MBTA’s Service Evaluation and Service Planning process to evaluate route performance and adjust services on an annual basis. Most recently, these standards were used to identify low performing services as part of the MBTA’s December 2012 proposal to cut service to help reduce current budget deficits.

Table 5: MBTA Service Objectives & Standards

Service Objective	Service Standard	Factors
Accessibility	Coverage	Walking Distance, Population Density
	Span of Service	Mode, Day of Week
	Frequency	Mode, Time of Day (increased for heavy customer demand)

² A Guidebook for Developing a Transit Performance Measurement System, TCRP Syntheses 88, 2003.



Reliability	Schedule Adherence	Established arrival window % of trips falling into arrival window
Safety & Comfort	Vehicle Load	Mode, Time of Day, Inside/Outside Core
Cost Effectiveness	Net Cost/passenger (bus only)	Deficient routes > 3 times bus average

As was shown in Table 2, the MBTA classifies each bus route within one of five classification types: local, key, commuter, express and community.

Montachusett Area Regional Transit Authority (MART)

MART has a set of formal service standards that were updated in January 2012 (see Table 6). These standards are used to evaluate progress toward achieving MART's mission and are intended to help achieve the following Service Objectives:

- **Accessibility:** Services should be geographically available throughout the community and should operate at convenient times and frequencies.
- **Reliability:** Services should be operated as scheduled within the permitted parameters.
- **Safety:** Services should be provided in a manner that is safe for the community, the consumers and employees alike.
- **Efficiency:** Services should be provided in a manner that promotes efficient use of resources and consumer quality of service.
- **Cost Effectiveness:** Services should be tailored to target markets in a financially sound and cost-effective manner.

Table 6: MART Service Standards

Service Objective	Service Standard/Guideline
Accessibility	Coverage Span of Service Frequency of Service
Safety	Vehicle Load
Reliability	Schedule Adherence
Efficiency	ITS Technologies
Cost Effectiveness	Net Cost/Passenger

These criteria are used in MART's periodic route evaluation process to identify the need for potential service changes. In addition to the above, a number of other criteria are also considered:

- Net cost per new passenger
- Net savings per lost passenger
- Changes in ridership
- Changes in travel time for existing riders
- Changes in operating costs
- Changes in fare revenue
- Key characteristics and demographics of the market
- Contribution to the achievement of external mandates, such as Title VI
- Other factors, as appropriate

Triangle Transit Authority (TTA), Raleigh-Durham, NC

The Triangle Transit Authority (TTA) serves the Raleigh-Durham area, providing local and regional bus service, as well as demand response and vanpool services. TTA measures its services at the system, route,



and route segment level with the results used in an annual service evaluation process. Its *Regional Bus Service Standards*³ also identify factors to be considered before introducing a new service.

TTA's measures are shown in Table 7. Of these, it uses Passengers per Vehicle Revenue Hours as its primary indicator of performance. For all measures, averages are determined for each indicator for peak, daytime, evening and weekend time periods and classified into one of the following categories:

- High-Performing: Greater than 125% of system or category average
- Average: Between 75% and 125% of system or category average
- Low-Performing: Less than 75% of system or category average for indicator

Action is recommended when a route is low performing in any one category, and may include route adjustments, special marketing, etc. Routes that are low performing against more than three indicators for nine months or longer are considered for elimination. Conversely, high performing routes are given priority for passenger amenities, and used promotionally to attract new riders to the system.

Table 7: TTA Performance Measures

Goal	Measure	Rationale or Application
Cost Efficiency	Passengers per Vehicle Revenue Hour	Used as "industry standard" for cost-efficiency
	Cost Recovery Ratio	Goal is 25%; also used to assess fare policy
	Operating Cost per Passenger Trip	Used to assess route performance
	Subsidy per Passenger Trip	Measures value of taxpayer investment
Environmental Support	Passengers per Vehicle Revenue Mile	Helps measure VMT and air quality benefits
Other	Pedestrian Accessibility	Based on sidewalks
	Vehicle Ownership	Evaluates transit dependency
	Land Use Planning/TOD	Zoning, residential density

Riverside Transit Authority (RTA), CA

The Riverside Transit Agency (RTA), which provides service in a large and diverse area of Southern California, uses both service standards and performance measures to assess the financial viability of its services (see Table 8). In addition, RTA's standards also reflect the state's farebox recovery requirements.

Table 8: RTA Service Standards & Productivity Measures

Service Delivery Standards	Factor
Service Coverage	Population Density
Span of Service	Type of route, day of week, time of day
Bus Stop Spacing	Type of route, housing units/acre
On time performance	85% of trips within 6 minutes of schedule
Headways	Type of route, service frequency
Transfer wait time	Type of route
Load factor	Bus capacity, #standees
Productivity Measures	
Productivity	Passenger/Revenue Hour Passengers/Revenue Mile
Cost Efficiency	Cost/Revenue Hour Subsidy/passenger mile Subsidy/passenger mile

³ *Regional Bus Service Standards*, Triangle Transit Authority, 2004.



	Subsidy/hour Subsidy/Mile
State Mandate	Farebox Recovery of 20% for Urban routes Farebox Recovery of 10% for Rural routes

RTA's standards are based on a classification system that categorizes its services as rural, local, regional, express, Dial-a-Ride, and trolley.

Worcester Regional Transit Authority (WRTA)

WRTA established formal service standards for both its fixed route and demand response services in 2009. WRTA standards are intended to help the agency provide consistent quality service and reflect a series of agency-wide goals and address a large range of activities (larger than any of the other systems described in this document):

- Customer service
- Service quality
- Economics and productivity
- Marketing
- Advertising
- Amenities
- Bus route designation
- Safety and security
- Fleet maintenance
- New services/extensions

Periodic reviews are conducted to compare route performance (ridership and cost) to the systemwide average, with the most recent review completed in 2008. Action is taken based on the ridership performance when compared to the systemwide average, as shown in Table 9.

Table 9: WRTA Performance Targets & Actions

Route Performance	Action
70-100% of system average	Staff Review
50-70% of system average	Report to Advisory Board
Less than 50% of system average	Route may be eliminated, or continued in six month intervals

Actions taken to improve performance may include a service adjustment, route restructuring, better marketing or the identification of additional revenue sources. Any one individual trip carrying less than five passengers is also considered for elimination. Special cases and circumstances may be accepted by the WRTA Board.

STATEWIDE PRACTICES

An increasing number of state DOTs are now incorporating performance-based management into transportation planning. To date, most state efforts have focused on highway travel. However, many states have recently begun to incorporate transit measures into their performance-based systems. A recent survey of state DOTs by the Transportation Research Board (TRB) found that: ⁴

⁴ *Statewide Transit Goal Setting*, National Cooperative Highway Research Program, Transportation Research Board, 2011.



- Most (65%) reported having qualitative transit goals, while 45% reported having quantitative ones. Several agencies have a combination of types.
- Less than a quarter (23%) reported having mode-specific transit goals.
- Three types of transit goals stood out as the most common. Ridership (61%), transit availability (58%), and broader multimodal goals (58%) were most frequently reported. Transit goals were least likely to address travel time and service delivery.
- DOTs are using transit goals for various purposes. Aside from helping guide or evaluate investment decision making, DOTs are relying on transit goals to guide local agencies and/or area stakeholders.
- DOTs are primarily developing and documenting their statewide transit goals as part of their statewide long-range transportation planning process. DOTs are also frequently documenting statewide transit goals in state transit management plans.
- DOTs are customarily tracking their transit goals (83%) and linking them to performance measures (77%).
- States are generally tracking their goals quarterly or annually.
- Many states without transit goals (72%) are either developing them or have considered doing so. States cited increased stakeholder interest and broader emphasis on performance measurement and improvement.
- DOTs that do not have statewide transit goals generally cited their departments' limited roles in transit management. Some mentioned that their departments were undergoing reorganization.
- Half of those without statewide transit goals have overarching multimodal goals.
- All respondents who directly operate transit indicate that they track their progress via statewide goals and have linked these goals to performance measures.

A number of motivations were cited for increased DOT involvement in developing transit measures. These include mandates from state legislatures, an increased focus on performance-based planning, the need to more effectively utilize limited funding, and increased efforts to improve interregional travel.

Finally, the TRB report concluded that the establishment of statewide transit goals and performance measures has re-oriented investment priorities, targeted assistance toward lagging systems (in Wisconsin and Minnesota) and encouraged the maintenance and replacement of transit assets (in Oregon and Maine). In other cases, the use of statewide performance measures has provided greater public accountability and helped to advocate for transit system expansion. For example, Missouri DOT used performance measures to provide evidence of transit demand to request additional state transit funding. Minnesota also uses performance data to demonstrate the need for increased statewide transit funding.

Examples of statewide practices are provided below.

California

The CA Transportation Development Act was enacted in 2008. It requires that performance audits be conducted on an annual basis to evaluate the efficiency, effectiveness, and economy of operation. Annual Productivity Improvement Plans (PIPs) must be adopted by each agency prior to receiving any state transit assistance.

- The Act established a target farebox recovery ratio that transit agencies must achieve to be fully eligible for Transportation Development Act (TDA) funds. The farebox recovery ratio is a blended percentage based on a requirement for urbanized transit service to maintain a farebox recovery of 20 percent and rural transit service to maintain a ratio of 10 percent.
- The state approved criterion for all new and existing service is for 60 percent to be productive and 40 percent to be based on coverage. At this benchmark, productive service is able to meet

California Best Practices

- Targets for Farebox Recovery and Passengers/Hour
- Different targets for Urban/Rural
- 40% of routes can be based on coverage, rather than productivity



mandatory farebox recovery. (Note: new services are exempt from performance standards for a three year period, enabling transit operators to maintain highly productive service and still meet the requirements of the Title VI Civil Rights Act of 1964.)

Although California is a large and diverse state, it classifies transit systems into only two categories: urban or rural.

Colorado

The Colorado State Legislature requires that the revenue/cost ratio for public transit systems be greater than 30 percent. Revenue includes farebox revenue and other non-tax revenue, including FTA funding. Note, however, that while the state mandates a minimum farebox recovery ratio, it does not provide funding for public transit operations.

Minnesota

The Minnesota Legislature has directed the Minnesota Department of Transportation (Mn/DOT) to collect and report on ridership and financial performance each year (Statute 174.247). As part of this process, local systems must submit an approved Management Plan that includes service goals and design guidelines, and report performance indicators. Mn/DOT's Office of Transit then assesses local goals and performance against standard indicators: cost-efficiency, service effectiveness, and cost-effectiveness. Mn/DOT sets productivity goals (passengers per hour and cost per ride) by type of route.

Minnesota Best Practices

- Statewide Transit Needs Assessment
- Statewide goals set for productivity and use of new funding
- Routes evaluated by segment within three peer groups
- Low performing routes risk loss of funding

Statute 174.247 also requires Mn/DOT to quantify unmet transit needs across the state and develop a plan to meet those needs. To do this, Mn/DOT develops an annual Greater Minnesota Transit Investment Plan to set priorities for investment and to identify priorities in the event of diminished funding.

In years where there is increased future funding, Mn/DOT's highest priority is to establish service in eligible locations where there is no service today. Secondary priorities for expansion include:

1. Expand service hours in the morning and night to provide more trips
2. Expand multi-county services to link more communities.
3. Provide service on more days of the week.
4. Expand service frequencies and coverage.
5. Expand service to provide consistent levels of service statewide.

In years in which transit funding is reduced, system preservation is the highest priority, and Mn/DOT will not support system enhancement. In these years, Mn/DOT evaluates funding needs according to the following three steps:

1. Mn/DOT will work with systems to redesign underperforming service segments.
2. Mn/DOT will reduce state and federal funding to systems with underperforming service segments.
3. If decreases in state and federal funding necessitate additional reductions, Mn/DOT will also reduce funding allocations to systems that meet or exceed performance standards.

Mn/DOT evaluates transit systems within three peer group classifications: Large Urban, Small Urban and Rural. Transit systems are classified into these groups based on system size, service area, and type of service provided.



North Carolina

North Carolina's Department of Transportation (NCDOT) publishes a guide to help community operators benchmark performance, with the goal of improving overall transit performance and quality of service. Under this system, transit operators are measured on a systemwide basis against four benchmarks:

- Subsidy per passenger trip
- Cost per passenger trip
- Passenger trips per vehicle hour
- Non-contract trips per non-urbanized service area population

North Carolina Best Practices

- Systemwide performance evaluation
- Systems grouped by the level of challenge to deliver transit
- Low performing routes are targeted for improvement

Systems are classified and ranked based on the challenges they face related to these factors (e.g. steep elevations and low population densities present greater challenges), and grouped into five peer groups based on "opportunity to succeed."

Systems are ranked within their classification group as "Superior" (85th percentile or above), "Acceptable" (above median rank) or "Not Acceptable" (below median). For systems that are ranked as "Not Acceptable," NCDOT helps to develop an improvement plan to address reasons for low performance and set actions/ targets/timeline for improvement. Local systems may also pursue improvement plans on their own.

Pennsylvania

In 2007, the PA General Assembly passed Act 44 that requires, among other things, that minimum performance standards be established for each local transit grant recipient. The minimum standards and measures that must be tracked and reported are shown in Table 10.

PennDOT also evaluates individual transit agency performance on a systemwide basis each year, comparing each agency to at least five peer systems, with peer group classifications based on:

- Revenue vehicle hours
- Revenue vehicle miles
- Number of peak vehicles
- Service area population

Pennsylvania Best Practices

- Systemwide performance evaluation
- Use of peer groups
- Low performing routes targeted for improvement
- Funding may also be at risk



Table 10: Pennsylvania Statewide Transit Performance Measures

Performance Measures	Indicators/Criteria
Staffing ratios	Ratio of administrative employees to operating employees Number of vehicles per mechanic
Productivity	Vehicle miles per employee Passenger and employee accidents per 100,000 vehicle miles On-time performance Miles between road calls
Fiscal	Operating cost per passenger Subsidy per passenger Operating ratio
Other Measures	<i>As desired by the local governing body</i>

Peer groups are established based on four quantitative criteria: total revenue hours, total revenue miles, number of vehicles in maximum (peak) service, and service area population. For each peer group, PennDOT calculates the average of each performance criteria by mode, and the standard deviation for both the peer group and each local transportation agency.

Four primary evaluation criteria are used to evaluate performance (the remaining criteria are used in the consideration of funding incentives):

- Passengers per revenue vehicle hour
- Operating costs per revenue vehicle hour
- Operating revenue per revenue vehicle hour
- Operating costs per passenger

Local transit agencies are considered to be in compliance if each of the four key performance measures are within one standard deviation of the average among the peer groups. Agencies are considered “at risk” if one or more criteria is more than one standard deviation below average.

PennDOT prepares a five-year trend analysis by performance criteria and mode for each local organization and the peer system group. If the five-year trend for all performance criteria by mode is positive and consistent with the peer trend, the organization is in compliance and no action is taken. If the trend is negative, and not in keeping with the peer group, the organization will be considered at risk. (If the 5-year trend is negative, but consistent with the peer trend, PennDOT will make an individual determination.) For example, if the ratio of administrative employees to operating employees is higher than the peer group, they must identify corrective action to address relative performance.

Agencies that are not in compliance are required to develop a strategic action plan focused on improving the system to achieve the established performance standards. If transit systems fail to implement an agreed upon action plan or fail to show progress in meeting minimum performance standards, PennDOT may reduce state operating assistance by up to 5%.

Vermont Best Practices

- State Policy Plan updates performance indicators every 5 years
- Routes evaluated within 6 peer groups



Vermont

- Low performing routes risk loss of funding

The Vermont Agency of Transportation (VTrans) develops a Public Transportation Policy Plan (PTPP)⁵ approximately every five years. The plan sets forth a series of transit performance indicators that are used to assess performance:

- Boardings per hour
- Boardings per mile
- Cost per hour
- Cost per mile
- Cost per passengers
- Daily boardings
- Farebox recovery
- Average passenger fare
- Daily revenue miles and % revenue miles
- Daily revenue hours and % revenue hours

VTrans requires transit providers to file monthly performance reports for routes that receive federal funding through the state; route performance is reviewed annually. Performance is measured against the average within seven different categories of route, classified by type of service, as well as population and service span:

- Urban
- Small Town
- Rural
- Demand Response
- Tourism
- Commuter

For funding decisions, VTrans uses three key indicators:

- **Productivity**, which is measured using a single indicator, which depends upon the route class. For most routes, the indicator is Boardings per Revenue Vehicle Hour. The exceptions are for Urban routes (Boardings per Revenue Vehicle Mile) and Commuter routes (Boardings per Trip).
- **Cost Effectiveness**, which is measured by Cost per Passenger Trip.
- **Local Share**, which assesses whether providers have generated 20% of their operating budget from non-federal/state sources.

For productivity, routes that perform at or above the statewide average are considered as “acceptable.” However, for cost measures, the minimum acceptable standard is twice the peer average. All routes are reviewed annually. New routes are given a three-year demonstration window, and after three years, if routes underperform for two consecutive years, VTrans works with provider to increase ridership. If those efforts are not successful, funding is withdrawn.

Virginia

Virginia Best Practices

- Goals for Ridership and Asset

⁵ Vermont's Public Transportation Policy Plan (PTPP), VTrans, November, 2007



Legislation passed by the VA Assembly in 2008 (Item 449.E.) provides that “the principles of local maintenance of effort, transit sustainability, public benefit, and asset management shall be incorporated into all public transportation programs” by the Virginia Department of Rail and Public Transportation (DRPT).

Maintenance

- Guidelines for Service Design
- Provision to ensure increased state funding goes toward enhancements

In response to this legislation, VA’s Commonwealth Transportation Board adopted a *Transit Sustainability and Investment Policy* in 2008 that provides guidance to DRPT regarding: (1) the allocation of transit funding; and (2) the setting policy goals desired to be achieved through transit funding programs. These policy goals are:

- Increase transit ridership per capita by at least 3% annually.
- Maintain existing transit assets as the first funding priority.
- Support improved land use, protect the environment, and maximize the use of available funding.

In order to ensure that public transit investments are appropriately maintained or expanded, three policy tools are identified:

1. **Asset Management:** DRPT has a statewide asset management tool that is used to evaluate alternative funding and asset replacement scenarios. The system forecasts capital needs over a 25-year horizon, which are used by local agencies to develop six-year capital plans.
2. **Transit Service Design Guidelines**⁶ that provide guidance on how to determine if proposed new services are the most feasible and appropriate mode for the market and operational environment, and if the proposed mode is the most cost effective option.
3. **Maintenance of Effort:** DRPT’s maintenance of effort requirement ensures that local spending is maintained from year to year. This allows any increase in state funding to be applied to transit improvements (not to replace local funding).

SUMMARY OF BEST PRACTICES/KEY THEMES

Local Service Standards

The use of service standards is common throughout the United States. Notable practices and elements include:

- Most transit systems that use service standards do so to provide the information needed to ensure effective service delivery. Others adopt service standards to comply with state requirements.
- For states that require local transit systems to adopt service standards, some (for example Minnesota and Pennsylvania) specify what those must include. However, most establish more general goals and objectives for transit service, leaving the design of specific service guidelines and standards to local transit systems.
- A relatively wide range of service standards are used throughout the country. However, most agencies focus on a few key measures. Some, however (including WRTA), use a large number of measures. PVRTA has focused on service quality measures and, despite recent service cuts and a fare increase, has seen ridership increase by 17% over the last five years.
- Most, but not all, transit systems use service standards to set minimum acceptable levels of performance. Many also specify the actions that will be taken to address underperforming services, including financial incentives or penalties within private operating contracts.

⁶ *Transit Service Design Guidelines*, VA DRPT, November, 2008



- Most transit systems, especially larger ones, classify services and develop different standards depending on route type and frequency (for example, local, limited stop, express, Flex/Route deviation, low density, etc.) and/or the population served (for example, commuter/work, community, student, special event, regional, circulator, shuttle, peak period).

State Level Performance Measures

As documented by the Transportation Research Board in 2011, state DOTs are increasing their use of performance data to improve the overall quality of transit service and to provide incentives for discretionary funding. Of 43 DOTs surveyed, 75% indicated they are now linking statewide transit goals to performance measures.

The sample of states reviewed as part of the Beyond Boston study found that:

- Most states focus on a few key performance measures (see Table 11). For fixed route service performance, *passengers per hour* and *cost per revenue hour* are the most common measures; for demand-responsive service, *passengers per hour* or *passengers per trip* are the most common measure.
- Most states track progress toward meeting certain goals and objectives that extend beyond just efficiency (for example, trips senior citizens, ADA trips, etc.).

Table 11: Most Common State Performance Measures

Key Performance Measures	States
Passengers per Revenue Hour	MN, VT, PA, NC, CA
Cost per Passenger	MN, VT, PA, NC, IA
Cost per Revenue Mile	IA
Farebox Recovery Ratio	NC, CA, PA, CO
Revenue/Subsidy per Passenger	PA, NC
Other Measures Used	
Passengers per revenue mile	VT (urban routes only)
Passengers per trip	VT (commuter routes only)
Operating cost per hour	VT
Operating cost per mile	VT
Average passenger fare	VT
% Revenue miles and hours	VT
Local Funding Share	IA, VT
Passengers per Capita	NC
Staffing ratios	PA
Accidents and Road Calls	PA
On-time performance	PA

- Many states evaluate performance to identify low-performance and take corrective action, to prioritize funding allocations, or offer funding incentives. These evaluations may be conducted at the systemwide or route level as shown in Table 12. In either case, systems or routes are classified into peer groups in order to recognize the differences and challenges of individual service areas (urban, rural, population density) or route characteristic (local, commuter, tourist, etc.)

**Table 12: Levels at Which States Conduct Performance Evaluations**

Evaluation Level	States
System/Agency Performance	NC, CA, PA, CO, IA
Route Performance	MN, VT
Route Segment Performance	MN

- States must collect consistent data from individual agencies to conduct a fair performance review, and many have developed reporting manuals or guides to facilitate this practice. Mn/DOT supplies each system with a digital template to be used to complete monthly reports.

POTENTIAL USE OF SERVICE STANDARDS IN MASSACHUSETTS

Summary of Issues

At the present time, several Massachusetts' RTAs have established and use formal service standards, while others employ a variety of different tactics to evaluate route performance or help design new services. Similarly, MassDOT employs a variety of methods to consider the effectiveness and efficiency of regional transit services, but there is no comprehensive, consistent, or readily available data to support such a review. Thus, while it is known that overall ridership has been declining, most RTAs and the state do not have the basic information necessary to identify underperforming services or to identify the reasons for declining ridership.

In addition, Chapter 25 of 2009 mandates MassDOT's Office of Performance Measurement and Innovation to establish program goals for all modes of transportation and to report publicly on progress to improve the effectiveness of transportation policies, projects and service delivery. The establishment of service standards, on both a local and statewide basis, combined with more effective service planning (Initiative 2) would provide the foundation and means to determine how to provide more effective and efficient service, and meet the mandates of Chapter 25.

Actions to Consider

Potential solutions and improvements—for discussion at the February workshop—to address the above issues include:

1. The development of a clear set of statewide transit delivery goals and objectives.
 - What should these be?
 - How should they be developed?
2. The classification of *transit services* by type (for example, urban local routes, rural local routes, demand response, etc.), and the development of service standards by service type.
 - How much agreement is there on this approach?
 - What should the service hierarchy be?
3. Alternatively, the classification of *RTAs* by type (for example, urban, suburban, rural, tourist-oriented, etc.), and the development of service standards by RTA type.
 - How much agreement is there on this approach?
 - What should the RTA hierarchy be?



4. The development of minimum statewide service standards for each service/RTA type.
 - What are the pros and cons to this approach?
 - What types of measures should be used (for example, passengers per vehicle hour, cost per passenger, etc.)?
5. The development of local service standards by each RTA. Local service standards would include a minimum consistent set of standards that would be used by all RTAs, plus additional measures that would reflect local needs and priorities.
 - How much agreement is there on this approach?
 - What types of measures should be used (for example, passengers per vehicle hour, cost per passenger, etc.)?



FOR MORE INFORMATION:

Bus Route Evaluation Standards, TCRP, 1995:

onlinepubs.trb.org/onlinepubs/tcrp/tsyn10.pdf

MBTA Service Delivery Policy:

[mbta.com/uploadedfiles/About the T/T Projects/T Projects List/2009 Service Delivery Policy.pdf](http://mbta.com/uploadedfiles/About_the_T/T_Projects/T_Projects_List/2009_Service_Delivery_Policy.pdf)

Best Practices in Transit Service Planning, (Center for Urban Transportation Research, University of South Florida, 2009):

www.nctr.usf.edu/pdf/77720.pdf

A Guidebook for Developing a Transit Performance Measurement System, TCRP Synthesis 88, 2003:

onlinepubs.trb.org/onlinepubs/tcrp/tcrp_report_88/Guidebook.pdf

Statewide Transit Goal Setting, National Cooperative Highway Research Program, Transportation Research Board, 2011:

onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rrd_358.pdf

Transit Operators Performance Measures, PA State Transportation Advisory Committee, 2007:

[ftp://ftp.dot.state.pa.us/public/Bureaus/Cpdm/TAC/TRANSIT_OPERATOR_PERFORMANCE MEASURES Final Report.pdf](ftp://ftp.dot.state.pa.us/public/Bureaus/Cpdm/TAC/TRANSIT_OPERATOR_PERFORMANCE_MEASURES_Final_Report.pdf)

Triangle Transit Authority Service Standards:

www.unc.edu/courses/2005fall/plan/127/001/TTAstandards.pdf

Virginia Transit Service Guidelines:

[www.drpt.virginia.gov/activities/files/Transit Service Design Guidelines FINAL.pdf](http://www.drpt.virginia.gov/activities/files/Transit_Service_Design_Guidelines_FINAL.pdf)